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(58) Field of Search

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INT CL<sup>6</sup> H04B 7/00 7/185 7/19 7/195 7/204 7/212 7/24

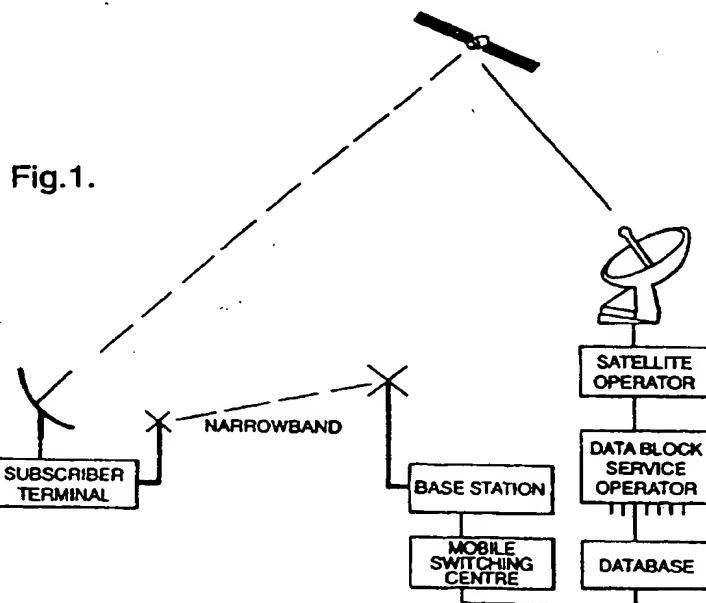
7/26, H04J 3/12, H04N 7/173, H04Q 7/00 7/06 7/20

7/22 7/38

ONLINE : WPI

(54) Telecommunications data transmission system

(57) A duplex narrowband start-up link between first and second stations A,B provides control and addressing information regarding data blocks which are sent via a unidirectional broadband link from the first to the second station. The data blocks may be encrypted and the encryption key may be transmitted via the narrowband link, the control and addressing information not being encrypted. The broadband link may be via a satellite and may employ an MPEG-2 signal but for transmission of non-video data. There may be a further unidirectional broadband satellite link for transmission of data blocks from the second to the first station, the narrowband link providing control and addressing information for both directions of data block transmission.



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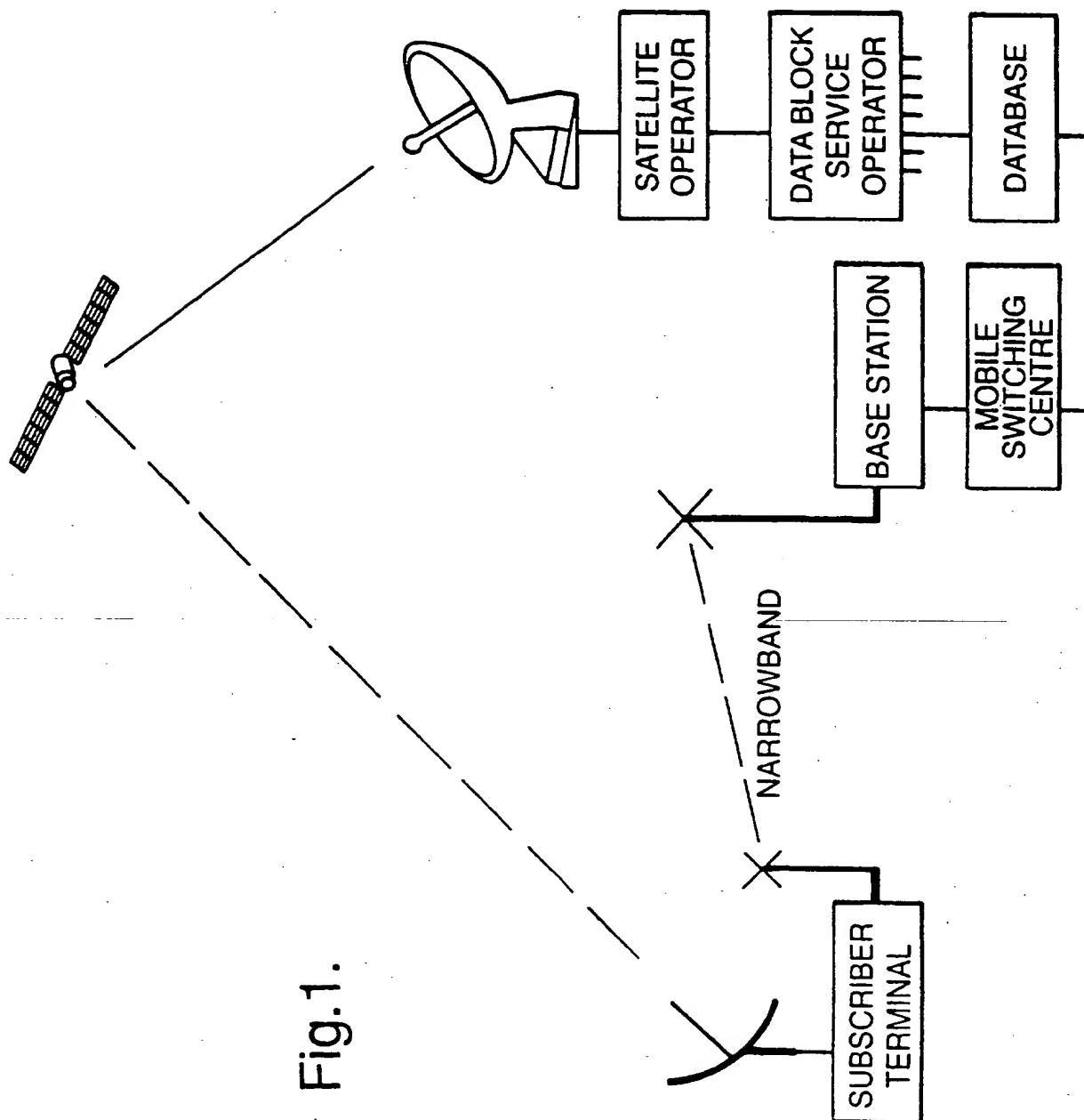


Fig.1.

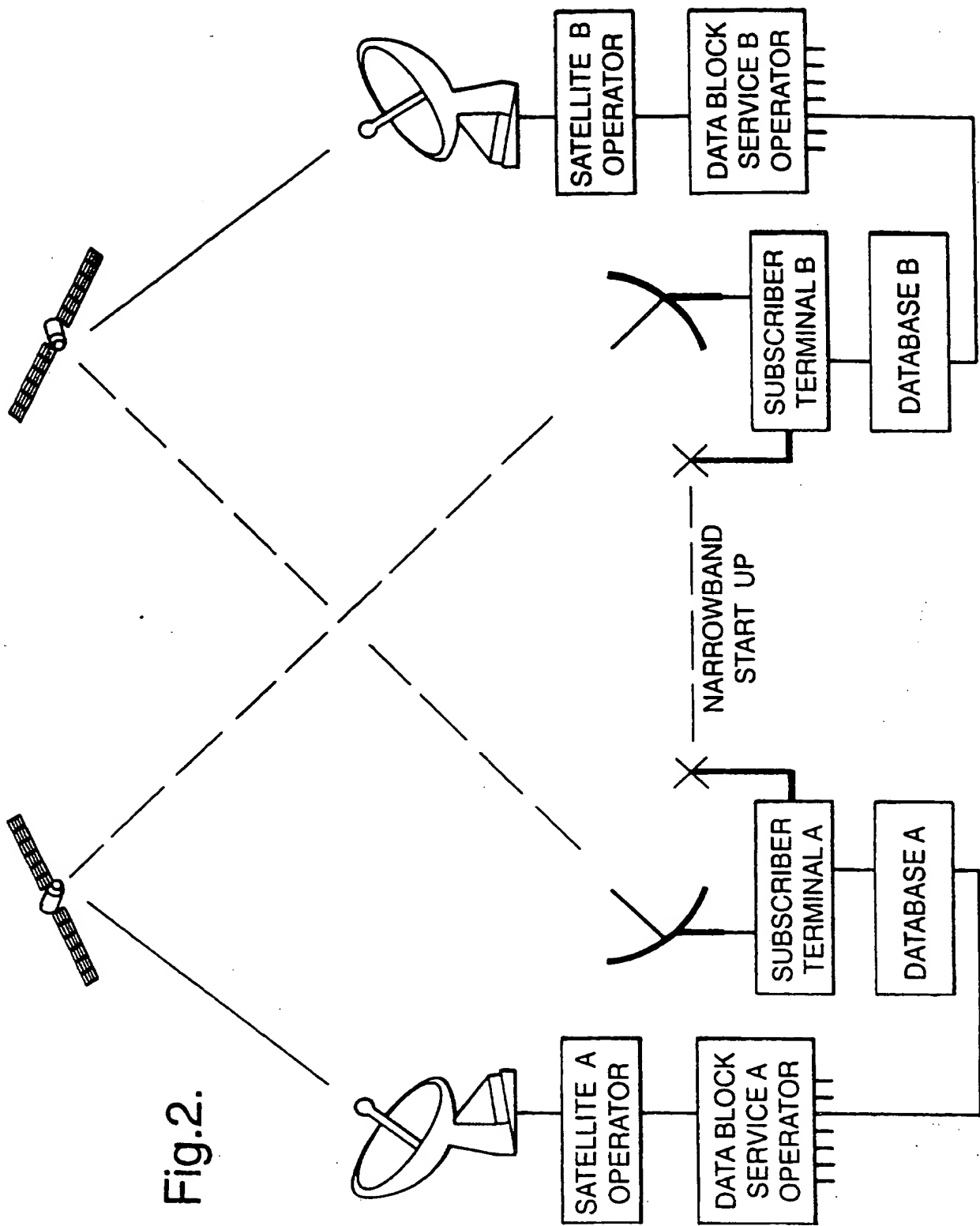


Fig.2.

### DATA DELIVERY SERVICES

5 Motion Picture Expert Group - 2 (MPEG-2) is one system for encoding video in a digital form, though it is to be expected that other encoding systems will occur in the future.

10 MPEG-2 can be transported via terrestrial radio, satellite and cable using the appropriate transmission modulation schemes and associated forward error correction methods. This provides a good quality video delivery arrangement and has a large bandwidth.

An MPEG-2 signal also includes the multi-channel audio encoding and the carrying of additional data .

15 Many MPEG-2 signals of encoded video, each with additional audio and data information, can be carried by one MPEG-2 TRANSPORT STREAM.

If required an MPEG-2 signal can carry only audio, or only data, which means that an MPEG-2 TRANSPORT STREAM has use as a general purpose method of carrying multiple data signals.

20 Consequently as the use of MPEG-2 increases, for delivering video, so does the opportunity to use the MPEG-2 TRANSPORT STREAM as a means of delivering other data services.

A complete MPEG-2 signal carrying only data as a high bit rate Teletext type of service may be used for providing general information. However such a fixed type of service is only suitable for carrying general public information even if a charge is made for receiving the information.

5

While MPEG-2 forms a convenient encoding and transport system for the transmission of data, other systems may be used.

10

According to the present invention there is provided a telecommunications data transmission arranged for transmission of data blocks and comprising a unidirectional broadband link and a duplex narrowband start-up link between a first and a second subscriber the narrowband link providing control and addressing information regarding data blocks sent via the broadband link from the first to the second subscriber.

15

The broadband link may be a satellite link.

The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

20

Figure 1 is a diagrammatic illustration of a unidirectional data delivery system; and  
Figure 2 is a diagrammatic illustration of a bidirectional data delivery system.

Using conventional dial-up narrowband circuits it is possible for a remote subscriber to be connected to a database. The call can be initiated by the subscriber or the database.

The quantity of information that subsequently needs to be transferred from the database to the subscriber may be expensive for the capability of the dial-up narrowband circuit.

5 If the subscriber is connected to an MPEG-2 Delivery Service, for example via a satellite as shown in Figure 1, then if the Database can forward an encrypted block of MPEG-2 data, to the Data Block Service Operator, for forwarding to the Satellite Operator, then the encrypted block of MPEG-2 data can be sent up to the satellite for broadcasting.

10 In order to ensure that only the correct Subscriber Terminal can decode the information, the encryption key is sent to the subscriber from the database via the narrowband circuit. The Subscriber Terminal is also supplied with further addressing necessary to identify the encrypted block of data intended for the Subscriber Terminal. The header, the further address and the sequence number should not be encrypted.

15 The unidirectional service described above can be used for a large number of applications. One application is for a head office sending information to one of its remote sites, particularly if they have temporary locations such as building sites.

20 Provided some Subscriber Terminals have the necessary packet identity codes, further addressing and encryption keys then a head office can broadcast to many local offices at the same time.

Although the use of Motorised Satellite Receivers enables the Subscribers Terminal to be portable, the use of Terrestrial Radio with Orthogonal Frequency Division Modulation

(OFDM) modulation would enable the Subscriber Terminal to be mobile.

The broadcast satellite used for this service only requires to be able to receive from one ground station. It does not need to be a communications satellite which can receive from many moving ground stations.

The unidirectional arrangement above relies on the Database having a wideband connection to the Data Block Service Operator.

Two databases which were both connected onto the same Data Block Service Operator would be able to perform block transfers without using the satellite.

It is possible for two Databases which are connected to Different Block Service Operators on different satellites, perhaps several thousand miles apart, to perform bi-directional data transfers. Provided that each Database also had a motorised satellite receiver and subscribers terminal, so that it can receive from the appropriate satellite, then two unidirectional paths can be configured.

In Figure 2, one path is from Database A, via Data Block Service Operator A and Satellite A, to the motorised satellite receiver and Subscribers Terminal of Database B.

The other path is from Database B, via Data Block Service Operator B and Satellite B, to the motorised satellite receiver and Subscribers Terminal of Database A.

In order to establish the bi-directional path only one narrowband path should be needed.

Provided the Data Block Service Operator is prepared to leave addresses in place then the narrowband path could be cleared once the two unidirectional paths were established, however this would mean there was no positive acknowledgement of an encrypted block of MPEG-2 data, unless the acknowledgement is performed by the sending of a complete encrypted block of MPEG-2 data in the opposite direction. A standard small acknowledgement block can be used for this.

Another use for the motorised satellite receiver and subscribers terminal that is equipped with a Database, is to directly monitor that the encrypted blocks of MPEG-2 data are being correctly forwarded by the satellite.

The size of the encrypted blocks of MPEG-2 data should be about one Mbit, in order to achieve a reasonable throughput with only one block outstanding though perhaps several sizes can be accepted:-

Very Small Acknowledgement Block (Bi-directional Service only)

Small encrypted data block of MPEG-2 (perhaps 0.5 Mbit/s)

Medium encrypted data block of MPEG-2 (perhaps 1.0 Mbit/s)

Large encrypted data block of MPEG-2 (perhaps 2.0 Mbit/s)

The download rate may be constrained by the data rate of the link between the Database and the Data Block Service Operator.



Charging will probably be done on a per block basis, with different rates for different block sizes.

CLAIMS

1. A telecommunications data transmission system arranged for transmission of data blocks and comprising a unidirectional broadband link and a duplex narrowband start-up link between a first and a second subscriber, the narrowband link providing control and addressing information regarding data blocks sent via the broadband link from the first to the second subscriber.
2. A system as claimed in Claim 1, wherein the data blocks are encrypted and the encryption key is transmitted via the narrowband link, the control and addressing information not being encrypted.
3. A system as claimed in Claim 1 or 2, wherein the data blocks are formed from data obtained from a database controlled by the first subscriber.
4. A system as claimed in any preceding claim, comprising a further unidirectional broadband link whereby data blocks may be sent from the second to the first subscriber, the narrowband link providing control and addressing information for both directions of data block transmission.
5. A system as claimed in any preceding Claim, wherein the broadband link or links employ an Motion Picture Expert Group - 2 (MPEG-2) signal.
6. A system as claimed in any preceding claim, wherein the and/or the further broadband

link is a satellite link.

7. A system as claimed in any preceding Claim wherein the data blocks are formed from data obtained from a database controlled by the first subscriber.

5

8. A telecommunications data transmission system substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.



Application No: GB 9617130.1  
Claims searched: 1 to 8

Examiner: M J Billing  
Date of search: 20 November 1996

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK CI (Ed.O): H4L LDB, LDG, LDLX, LDRR, LDSJ, LDSX; H4K KTA; H4R RCSS.  
Int CI (Ed.6): H04B 7/00, 7/185, 7/19, 7/195, 7/204, 7/212, 7/24, 7/26; H04J 3/12;  
H04N 7/173; H04Q 7/00, 7/06, 7/20, 7/22, 7/38.  
Other: ONLINE : WPI.

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB2270815A (ROKE MANOR) - Abstract	1 at least
X	EP0720309A2 (A T & T) - Figs.2,3,4; column 3 line 16 to column 4 line 16	1,2 at least
X	EP0700225A2 (A T & T) - whole document	1 at least
X; Y	EP0396062A2 (CABLESHARE) - Abstract	1,3,7; 2,6 at least
X; Y	WO95/15658A1 (DISCOVERY) - page 15 line 1 to page 16 line 15	1,3,5,7; 2,6 at least
Y	WO85/03830A1 (A T & T) - page 3 lines 7-28, page 6 lines 14-18	2,6 at least
X	US5440554 (ALCATEL) - Fig.1; Abstract, column 3 lines 9-21, column 3 line 44 to column 4 line 35	1 at least
X	US5355374 (SCIENTIFIC-ATLANTA) - Abstract	1 at least

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
E Patent document published on or after, but with priority date earlier than, the filing date of this application.



# The Patent Office

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Claims searched: 1 to 8

Examiner: M J Billing  
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Category	Identity of document and relevant passage	Relevant to claims
X; Y	US5133079 (BALLANTYNE) - column 4 lines 2-19, column 5 line 8 to column 6 line 38	1,3,7; 2,6 at least

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

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A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
E Patent document published on or after, but with priority date earlier than, the filing date of this application.

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